

Mr. Dick Daniel
Assistant Director for Habitat Restoration
CALFED Bay-Delta Program

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Ecosystem Restoration Program Plan (ERPP), Volume II: Ecological Zone Visions

The Department of Fish and Game (DFG) has reviewed the subject document and offers the following comments to assist you in completing the ERPP. Our comments take the form of both general comments that apply to broad portions of this volume as well as specific comments that are annotated by page and paragraph. Overall you and your staff should be commended for the work you have done to bring Volume II to this stage of development. We believe that while significant work remains to complete this volume the progress you have made has provided a solid foundation and assisted us in focusing our comments on those areas that would, in our view, enhance the quality of the ERPP and improve the likelihood for successful implementation.

We generally refrained from including editorial comments. The one generic editorial comment we do wish to make involves the repetitive nature of much of the zone visions. We understand the need for some repetition since not every reader will read the entire volume and instead will likely focus on their primary area of interest. Nevertheless, within each zone vision there is a high level of redundancy that can be eliminated without detracting from the quality of the vision.

General Comments

The DFG is concerned about the target classification scheme used in this volume. We understand that there is a significant benefit to using a rating process which discloses any scientific uncertainty. The target classification scheme, however, currently in Volume II which uses one, two, or three diamonds may need to be adjusted in order to make it a useful tool. The introductory paragraph states that the ratings are given based on the target's reliability in contributing to attainment of the implementation object. In this context, a target that says increase tidal emergent wetland by 1,000 acres will, without question, contribute to an implementation objective of increasing that habitat. Yet many one or two diamond ratings are given for these types of targets when a three diamond rating would be more appropriate. If the rating is given based on the scientific certainty that the target, when attained, will contribute effectively to restoration of the estuary then it should be described and used in that

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manner. Editorial work is needed to clarify its purpose. We have additional comments on the rating system in our specific comments.

Some discussion of intermittent tributaries and their use as chinook salmon rearing areas per studies conducted by Paul Mauslin would be a useful addition and would be consistent with the ecosystem approach being used in the ERPP.

The ERPP should include references to acquiring existing high-quality habitats as part of the restoration plan. Protection of existing high-quality habitats can be an important companion strategy to creating new habitats. Created and restored habitats cannot always guarantee success; existing high-quality habitats already provide necessary ecosystem functions. Creation and restoration may be more suitable for severely degraded habitats.

Many statements are made regarding improvements in ecosystem processes that are made without source references. This makes it difficult to know which statements are supported by scientific investigations, which are based on experience, judgement, or scientific inference, and which are suppositions. Where possible, the ERPP should indicate sources of knowledge or bases of supposition.

Overall, one can conclude that much of what is proposed is an improvement over existing conditions, although the specifics of what we can expect in terms of population increases are not quantitatively presented in most cases. Perhaps this is because for some species the known quantitative data is based on delta outflow and this document makes no quantitative assessment of how much flow is going to be provided for environmental restoration. If this is the case, it needs to be stated as such. If there are other reasons they need to be incorporated in this document as well.

Many of the actions, if carried out, will not only result in a more productive and healthier ecosystem but also a much more esthetic environment than what we currently have. Consider including a statement on the improved esthetics of habitat restoration.

In reviewing the document, the section for the Suisun/North Bay was found to be confusing since many of the references are objectives for the Delta which do not seem to relate to the focus of the chapter. The sense is that these sections were paraphrased or lifted from other sections and applied to the Suisun/North Bay section but are not applicable to the North Bay wetlands and tidal marsh systems. This zone's vision should be carefully redrafted.

We have a number of comments on those portions of the ERPP that address the food web. The focus of our comments is on the need for the ERPP to fully disclose areas of

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scientific debate and uncertainty with respect to the food web. The statements in this document regarding the food web could be improved significantly by referring to the literature on the estuary. The list of references, for instance, does not include any papers written on planktonic invertebrates. We recommend that the author of this document refer to (1) Kimmerer and Orsi. 1996. Changes in the zooplankton of the San Francisco Bay estuary since the introduction of the clam *Potamocorbula amurensis*. Pp. 403-424 in San Francisco Bay: the ecosystem. J.T. Hollibaugh, ed. AAAS, Pacific Division, San Francisco, California; and (2) Orsi and Mecum. 1996. Food limitation as the probable cause of a long-term decline in the abundance of *Neomysis mercedis* the opossum shrimp in the Sacramento-San Joaquin Estuary. Pp. 375-402 above. The most serious shortcoming of not recognizing the findings in these papers is that assertions in the ERPP that improving flows and reducing exports will increase secondary production may not fully account for the influence of other factors in the level of secondary production. Analyses done by Kimmerer suggest that losses to export pumping are too small to have an impact on *Neomysis* and *Eurytemora*. These organisms may be affected more by the Asian clam than by freshwater flow. The statement at the bottom of page 85, left column, that proposed improvements in spring flows, channel hydraulics, wetland habitats, and floodplain inundation should lead to a healthier and more productive aquatic food web may be true for the Delta but not for Suisun Bay where the Asian clam may have the largest influence over phytoplankton. The statement on page 85 that follows the above says that "Improved water quality and sediment retention ... will also increase food web productivity." However, "improved water quality" is not defined and it is not at all clear how sediment retention can increase food web productivity. Improving water quality can actually reduce productivity as happened in the Stockton area of the San Joaquin River after tertiary waste treatment began. Both phytoplankton and zooplankton concentrations there declined sharply and have remained low ever since.

The ERPP should disclose that one of the most important factors affecting mysid shrimp and zooplankton is now the Asian clam, which preys on the young of some copepods and consumes the phytoplankton food of mysids, copepods, and rotifers. Another important fact is that although many native species of zooplankton have declined they have been replaced by introduced species that are as abundant as the natives once were. In other words, the loss in secondary production has been confined to rotifers and mysids and to a lesser extent, cladocerans. Copepods as a group have been unaffected because of the abundance of introduced copepods, indeed total copepod abundance has increased compared to the early 1970s. Copepods are more important to larval and small fish than the other zooplankton groups. This may be why we haven't linked changes in fish abundance to zooplankton abundance. Increasing outflows in dry and critical years may result in higher phytoplankton concentrations but the concentrations may not be as great as they were in the early 1970s and may not be accompanied by high zooplankton abundance due to the Asian clam.

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The ERPP should disclose that there are areas of potential disagreement among scientists with regards to how effective restoring tidal emergent wetland and shallow water habitat will be in restoring the estuary's aquatic ecosystem. One issue relates to the justification for the acreage targets linked to habitat levels in the early 1900s when some believe the estuary was relatively healthy as late as the 1950s well after most wetland habitat losses had occurred. Another issue relates to how drastically the species composition has changed since the late 1800s and how the current species composition may result in improvements for introduced resident fish and an increase in the predation on splittail and juvenile chinook salmon. In essence, historically blackfish, native suckers, Sacramento perch, and thickettail chubs may not have represented the same level of predatory threat.

Regarding steelhead, this document is a vast improvement over all other Central Valley anadromous salmonid restoration plans that have been developed over the past 20 years which have largely ignored naturally-spawning steelhead. It is believed that this has been a contributing factor in their decline and the resultant proposal to list them as endangered under the Endangered Species Act (ESA). The document needs to state that Central Valley steelhead are officially a Proposed Endangered Species under the ESA. Except for those comments noted as follows, this document adequately addresses the fact that restoration of steelhead populations will require measures that are different from those to restore chinook salmon.

The single-most limiting factor for steelhead populations in the Central Valley is lack of access to an estimated 95% of the historical spawning and rearing habitat (Reynolds et al. 1993; Yoshiyama et al. 1996) because of dams. Consequently, steelhead are relegated to spawning in low elevation reaches that were historically only used as migration corridors. We are pleased to see that lack of access is addressed in specific Ecological Zones and Units. The document, however, should acknowledge that this is the greatest stressor for steelhead on a system-wide basis. We are also pleased to see that high water temperatures are identified as a major limiting factor for naturally spawning steelhead populations that exist in tailwater reaches below the large reservoirs.

In the Implementation Objectives, Targets, and Programmatic Actions section of appropriate Ecological Zones/Units, studies should be proposed to examine the genetic composition of wild resident rainbow trout populations that are isolated from the ocean by dams (e.g. Middle Fork American River, Middle Fork Stoney Creek, Putah Creek), some of which apparently still exhibit migratory behaviors. If comparison with other known rainbow trout genotypes indicates that these populations are derived from native Central Valley steelhead populations that were isolated when the dams were closed, this would be the most appropriate source from which to reestablish native steelhead populations to streams where they have become extirpated. Genetic studies have demonstrated that this phenomenon of

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“forced” residualization of steelhead populations by dam construction has occurred among southern California steelhead populations (Nielsen 1994; Nielsen et al. in press)

There needs to be some acknowledgment of the fact that severe fragmentation of naturally spawning steelhead populations has probably contributed to the overall decline. Central Valley steelhead populations are so disjunct that lack of dispersal from the historically more robust populations to smaller populations inhabiting relatively unimpacted stream systems (such as Mill and Deer creeks) may help to explain why these populations are not recovering. Recovery of steelhead populations in the larger tributaries (e.g. American, Feather, Stanislaus rivers) could help to reestablish other populations.

The ERPP should include a discussion regarding its contribution to the durability and resiliency of the estuary once its ecological health is restored. For instance, a discussion should be added which addresses future population growth and future increases in demand for water. Ecosystem restoration and maintenance requires assured amounts of water for the environment which will not be reduced for the ratchetin effect of population driven demand for other uses.

Specific Comments

Page 2, Table 1: The east and west San Joaquin ecological units should have the word Basin added to their name. The table should be consistent with Figure 19 which shows two Ecological Units: the upper and lower West San Joaquin Basins.

Page 3, Paragraph 3, Left column, Last sentence: Replace “re-engineered water diversions” with alternative wording relating to changes in water management or facility re-operation. With the exception of screens and attempts to improve fish hauling at collection facilities, little has been done up until now to re-engineer water diversions to assist in restoring fish and wildlife resources of the Bay-Delta.

Page 4, Paragraph 2, Right column, Sentence 1: This sentence states that each of the 14 zones is characterized by a predominant physical habitat type or species assemblage. This statement could be misleading since some zones are represented by a large assortment of habitat types and species assemblages. Consider a more complete discussion of the rationale for the zone boundaries and how the 14 zones were ultimately selected.

Page 5, Column 1, Paragraph 2: There is some concern about labeling the concentration of toxic substances in fish tissue as an “indicator of ecosystem health.” Tissue contamination often has a biological threshold level, where below this concentration, there is no individual or

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population effect. Occasionally, known contaminant levels in fish may approach possible biological effect levels (e.g. selenium in sturgeon) in some local fish species.

Page 5, Phasing: We recommend modifying the phasing discussion. As worded, it states that the restoration strategy will focus on endangered species first and then efforts will *expand and focus on the broader issue of restoring ecological health*. DFG believes that this statement conflicts with much of what is said in the Introduction and with the basic principle that *restoring ecological health* is fundamental to restoring listed as well as non-listed species.

Page 6, Third Bullet: DFG is concerned about the implications of the last bullet under number 4. It could be interpreted as overemphasizing economic considerations. We recommend reworking as follows: "...ERPP implementation, including adjustments to ecosystem targets, funding priorities, and restoration techniques to attain ecosystem objectives expeditiously, thus ensuring that ...".

Page 6, Terms Used in the ERPP: On page 3 the term *solution alternative* is used. Some readers of the ERPP may not be familiar with this term. Consider adding a definition for it.

Phasing: The issue of how long it will take to complete the actions should be integrated into the phasing discussion. For instance, it makes sense to start early on difficult, slow acting measures that can be implemented more quickly.

Page 6, Ecological Process: Ecological process is used apparently only for abiotic processes. The ERPP should explain where ecosystem functions that are biotic to fit into this list. For example, it should describe where the fixation of carbon and the input of carbon (i.e. primary production) fit in. Shouldn't this be considered to be an ecological process, trophic process, and a food web process? Additionally, there is no mention of food web at this point in the document but it is referred to later throughout.

Page 6, Stressor: In the definition of *stressor* the word *adversely* is used. This is an emotionally charged word; consider changing the word to *dramatically*, a more neutral adjective. Natural *stressors* such as a 100-year flood may not always be ecologically detrimental to the ecosystem. Some communities or populations require periodic "resetting" events to maintain diversity or population vigor.

Pages 7 and 8, Classification of Targets: Clarification of this rating process would help avoid confusion regarding how the process will interface with Phasing described on page 5. The implication is that actions that fall under a target rated with one diamond would not go forward until the additional research, demonstration, and evaluation are completed. A similar level of confusion rests with targets rated with two diamonds. The ERPP should explain that targets

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will be aggressively pursued even though they may receive a lower rating. The DFG is concerned that if the ratings are taken literally, that very few targets will be pursued until after extensive research or small scale pilot projects are completed and detailed monitoring proves the target's actions effective. If that occurs for instance in the Delta Ecological Zone, only about ten percent of the nearly 70 targets would be pursued in the near term (1-10 years). Only targets related to areas such as fish screens, ballast water regulation, dredging guidelines, and increased law enforcement would be pursued. All are curiously related to stressors and not the highest priority, restoring ecological processes. We, therefore, recommend that the ERPP explicitly recognize that the level of "reliability" can vary among the programmatic actions as well.

Page 9, Paragraph 1, Sentence 3: *Tule Marsh* is a very generic description of the vast habitats found within the Bay-Delta Estuary. According to the San Francisco Estuary Project's "Status and Trends Report on Aquatic Resources in the San Francisco Estuary," the historic Delta supported extensive wetlands including ponds, sloughs, marshes, and a riparian strip along the rivers that was as much as 40 miles wide. An accurate portrayal of the historic Delta should be included to help important determine baseline conditions for restoration.

Page 9, Column 2, Paragraph 1: One key assumption of adaptive management is that we may discover the cause of an environmental problem if we examine the response to a type of treatment. Unfortunately, restoration actions or projects are not "reproducible" experiments. Often the observed results are the results of complex set of variables and conditions that occurred during the study period or before this period. This condition may be unique and the key controlling factors may not be the ones studied. Therefore, there is a high risk that managers may misinterpret the results of the "treatment" unless duplicate field trials are conducted.

Page 9, Right Column, Second Paragraph, Sentence 1: The use of the term *waterflow* in a parenthesis after hydraulics provides an incomplete picture of what hydraulics addresses. We recommend referring the reader to Volume I for a definition or expecting the reader to look to Volume I for clarification of any term used. The word *waterflow* should be deleted here.

Page 10, Column 1, Last Paragraph: The ERPP states that *actions may also appear to be ineffective at a test scale, but be effective on a broader scale of implementation*. The ERPP should explain how managers would determine that this effect had occurred. Adaptive management would require that a proposed implementation action would be reconsidered or downgraded in importance if the pilot test "failed."

Page 10, Right Column, Paragraphs 1 through 4: Flow information for the Delta is confusing. These paragraphs should be reformatted to make it clear when data are being described for

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inflow or outflow. For instance, the first sentence of paragraph 2 belongs in the first paragraph since we believe it is a continuation of a description of spring flows through the Delta (presumably inflow). Another way to assist in clarifying these data is to use bar graphs which depict historical versus unimpaired for both inflow and outflow.

Page 12, Right column, Paragraph 2, Sentence 2: The sentence should read November through March. Significant changes were observed in April and May in the 1960s. This sentence and paragraph should be modified accordingly.

Page 12, Paragraph 3: Delete this paragraph and add: "...provided by output from a particle transport model (DeltaMOVE)" at the end of the second sentence in the second paragraph.

Page 13, Paragraph 1, Sentence 1: Clarify *spawned population* that this statement is referring to.

Page 13, Species - Habitat Association Table: Add word "tidal" before emergent wetland for the black rail.

Page 15, Paragraph 2, Last Sentence: List the fish species that depend upon Shaded Riverine Habitat.

Page 16, Column 1: Consider including agricultural practices as a stressor. Agricultural reclamation activities have eliminated most of the original emergent marsh in the Delta, and unfavorable agricultural practices such as pesticide spraying, clean farming, and crop changes negatively effect wildlife in the Delta. In the agricultural settings there may be virtually no insects present resulting in the bottom end of the terrestrial food web being greatly reduced or absent.

Page 16, Paragraph 3: The toxins have been demonstrated only in bioassay.

Page 16, Paragraph 4: The implication that the population of green sturgeon is stable may not be an accurate assessment of this species' condition; the vision in Volume I suggests that there is a need to improve conditions for sturgeon. Furthermore, this section does not adequately set the stage for the vision presented on page 32.

Page 17, Left Column, Paragraph 3: The statement that the American shad population is stable and healthy is not accurate. The vision for American shad in Volume I suggests a need to increase populations.

Page 17, Right Column, Paragraphs 2 through 4: It may not be appropriate to include sections on marine fishes for this Ecological Zone. Consider deleting it here and putting it in the Suisun Bay and north San Francisco Bay zone. If kept, in the second sentence of paragraph 2, delete

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" . . . other fish and waterfowl..." and insert "wildlife."

Page 19; Right Column, Last paragraph: Since only the gates are in this unit, modify this sentence to read: "...Delta Cross Channel (DCC) gates which, when open, allow Sacramento River Water to flow into the DCC to the forks of"

Page 22; Left Column, Paragraph 2, Sentence 3: The water year classification should be included. We believe it is intended to be drier water years.

Page 23: The land use information for the Central and West Delta Ecological Unit is missing and should be included.

Page 23, Paragraph 7, Sentence 1: Consider specifying the *electric generating stations* referred to.

Page 24, Paragraph 2: Include terrestrial food web productivity. Increased terrestrial food web productivity will naturally come from restoration of riparian, seasonal wetland, and emergent marsh communities. Increased terrestrial community health is a necessary component to Delta ecosystem restoration and may be more heavily impacted than the aquatic component.

Page 26, Paragraph 7, Sentence 1: Carefully evaluate improvements to existing shallow-water habitat. Fill placed over an existing productive shallow-water habitat may not function as well the existing habitat did.

Page 26, Paragraph 7, Sentence 7: Water hyacinth control should be described so that impacts can be properly evaluated.

Page 27, Left Column, Paragraph One: Add the word "gates" after DCC in the first line.

Page 27, South Delta Ecological Unit: This section should emphasize the potential for large scale restoration of tidal emergent wetland and tidal perennial aquatic habitat considering the current land elevations. Because land subsidence has been less dramatic, restoration can proceed on a much faster track than in the Central and West Delta Ecological Unit.

Page 28, Right Column, Last Paragraph, Last Sentence: The potential actions described of forcing tidal flows through other channels is contrary to the overall approach of the ERPP of restoring processes. We recommend deleting reference to altering tidal flows in channels with high quality, mid-channel islands, shoreline marshes, riparian or shallow water.

Page 29, Second paragraph, Left Column, Last Sentence: This sentence describes the relative

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value of restored habitat if Alternative 3 is selected. A similar sentence should be added to the section on the South Delta Ecological Unit.

Page 29, Central Valley Stream Temperature: Add reference to Delta channels being used as rearing areas for salmon as well.

Page 30, Seasonal Wetland Habitat, Last Sentence: Add *terrestrial* to *aquatic food web of the Delta and Bay*.

Page 31, Predation and Competition: Excluding fish such as salmon and delta smelt from areas that harbor concentrations of predators (such as Clifton Court Forebay) should in the vision.

Page 32, Chinook salmon: Saying that salmon populations will remain stable implies that actions taken will have no beneficial effect. We do not agree and believe "remain stable or" should be deleted.

Page 32, Paragraph 6, Sentence 1: Benefits associated with late-winter and spring flows are subject to operations and diversions. Currently, the preferred alternative for the Interim South Delta Project (ISDP) calls for an increase in diversions during fall and winter months to make up for reduced diversions in the Spring. CALFED needs to provide assurance that these flows will remain in the system for fisheries benefits.

Page 33, Paragraph 2, Sentence 4: Identify what the *large invertebrates* are.

Page 33, Paragraph 3, Sentence 2 & 4: Has it been demonstrated that zooplankton are entrained to the extent of reducing the populations significantly? This is not the case based on Wim Kimmerer's analyses of zooplankton entrainment.

Page 35, Integration with other Restoration Progress: Sections on page 90 and 91 of this volume belong here as well.

Page 35, Right Column, Paragraphs 1 and 2: These paragraphs appear out of place and perhaps are better suited to discussions on Phasing and Implementation specific to this zone. A separate heading in the zone visions may help address this concern.

Page 35, Right Column, Paragraph One: Discussions should include reference to new screens at any isolated facilities that may be selected as the preferred CALFED Alternative.

Page 36, Central Valley Habitat Joint Venture: This paragraph needs to be restructured so it

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captures information contained on page 90 of this volume and more completely describes the Riparian Habitat Joint Venture and SB-34 programs.

Page 37: A general rationale section should be provided here for processes like it has been for habitats.

Page 37, Target 2: It would be helpful to clarify what percentage of these "San Joaquin River" spring inflows are expected to be met by the east side tributaries to the Delta and San Joaquin River. Some of this explanation could be included in the rationale starting on page 38. The linkage with Target 3 would also help especially for dry years when Sacramento inflow is targeted at a minimal rate of 13,000 cfs for the entire month of May.

Page 39, Paragraph 3: White and green sturgeon have finished spawning in most years by May. May flows, however, are likely important for moving sturgeon as well as striped bass to the nursery areas downstream to the Delta where the nursery conditions are likely better for survival than they are upstream.

Page 40, Central Valley Stream Temperature: The temperature targets are generally insufficient to ensure restoration of chinook salmon. Targets should instead describe keeping water temperature below 60° in the spring, since at 65°, significant temperature related mortality is occurring. Also, mean daily water temperature is not an adequate way of measuring temperature effects on salmon. Temperatures should be measured as a not to exceed daily maximum.

Page 40, Delta Channel Hydraulics: The one diamond rating for Target 1 is inappropriate. A three diamond rating should be given. We recognize that Targets 1 and 2 were developed in a manner that would not predetermine the selection of a Preferred Alternative for CALFED. However, because of that some programmatic actions would become unnecessary and other new actions included if some variation of Alternative 3 is selected as the Preferred Alternative. At a minimum, the rationale section should explicitly recognize this. Language like the last sentence in the rationale for the Aquatic Food Web on page 42 should be added here as well.

The description of target 1 should simply be: "Reestablish more natural internal Delta water flows." The present description is unnecessarily constraining and isn't really necessary to avoid preselecting a conveyance alternative.

Add a second target as follows: Restore hydrodynamic conditions in the rivers and sloughs of the Delta sufficient to support targets for the restoration of aquatic resources.

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Page 41, Rationale: Add striped bass to delta smelt as a species to be transported as larvae.

Page 41, Paragraph 11, Sentence 1: *Helping to restore...* The need is to *restore* hydraulic conditions to their natural state.

Currently, there are four physical barriers in the South Delta, all of which become permanent with the ISDP. ISDP is part of many CALFED alternatives. Clarify how this project's preferred alternative (Four permanent barriers, a new intake in Clifton Court Forebay, increased diversions, increased pumping, and dredging) will be consistent with the CALFED alternatives.

Page 42, Last Paragraph, Sentence 1: Regarding the discussion on restoring the interface, etc. clarify what level restoration efforts will attempt to achieve. For example, is the plan to restore to 1906 conditions?

Page 42, Bay-Delta Aquatic Food Web: Target 1 should be rated with three diamonds.

Page 43, Paragraph 1, Sentence 3: Consider stating, "... *damage the ecosystem...*" Ecological health is not well defined and not the best choice for this statement.

Page 43, Tidal Perennial Aquatic Habitat, Rationale: This section should also explain that this habitat will be restored as a mosaic with restoration of tidal emergent wetland and delta sloughs.

Page 45, Delta Sloughs, Rationale: This section should also explain that this habitat will be restored as a mosaic with tidal perennial aquatic habitat and tidal emergent wetland.

Page 46, Programmatic Action 1E: A footnote should be added to clarify whether the area restored as part of this action is included in or additive to the target for midchannel islands.

Page 46, Right Column, Rationale: The second paragraph should be deleted since it refers to non-tidal emergent wetland. If kept, it needs to be modified to explain that in some areas non-tidal emergent wetland may be an intermediate step to assist in subsidence control or island accretion prior to restoring tidal action.

Page 47, Left Column, Rationale: The last sentence should be modified since no specific acreage targets were presented for any unit. We recommend that the rationale recognize the substantial pre-1900 losses in the South Delta Unit and that a significant amount of tidal

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emergent wetland (up to 25%) would be restored depending on the water conveyance alternative selected.

Page 47, Programmatic Action 1E: A footnote should be added that in the long-term up to 75 percent of this acreage may be restored to tidal actions when appropriate land elevations are achieved through island accretion. These restored acreage totals would ultimately be additive to the tidal emergent wetland targets. Upon restoring tidal action, targets for the Central and West Delta Ecological Unit would be subsequently adjusted to avoid the need to restore additional non-tidal emergent wetland above approximately 2,500 acres.

Page 48: The phrase, "...develop a cooperative program to..." should be added to programmatic actions 2A and 3A.

Page 48, Rationale: The discussion of a land-water interface needs to be clarified since the rationale primarily addresses areas subject to tidal action.

Page 49, Left Column, Rationale: The last sentence should be modified so that it doesn't state that, "most of the seasonal wetlands" should be subject to periodic flooding. Instead it should state that "significant areas of restored seasonal wetlands."

Page 49, Riparian and Riverine Aquatic Habitat: The specifications describing the targeted widths of the riparian corridor apply to other targets in the Delta not just 1 and 2. The ERPP should use 40% over 75 feet wide and 20% over 300 feet wide for the remaining targets.

Page 50, Rationale, Last sentence: The plant species listed are not found in this plant community. They should be deleted or an explanation given for how riparian woodland restoration will benefit these plants.

Page 51: Perennial Grassland Programmatic Action 1C: This should state 1,000 to 2,000 acres and a new action, 1D, should be added for the Central and West Delta Ecological Unit of 1,000 to 2,000 acres.

Page 53, Water Dimensions: Programmatic Action 1B should be reworded to allow for relocating the intakes of the South Delta pumping plants, screening those new intakes, and including fish bypasses as needed.

Page 53, Levees, Bridges, and Bank Protection: The targets described should include a footnote stating that the recommended mileage targets are additive to those described for Riparian and Riverine Aquatic Habitats.

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Page 53, Rationale: Chadwick and Von Geldern's paper is cited here yet it has more to do with exotic introductions. There is no 1990 paper by DFG cited in the references and Exhibit #2 to the 1992 State Water Resources Control Board hearing on the Delta should be cited since there was information therein regarding the diversion effects on striped bass in the Delta. Also, Exhibit #4 on white catfish would have some information on diversion effects.

Page 55, Invasive Riparian and Salt Marsh Plants: How realistic is it to remove 50% of these plants? List which native riparian vegetation species have been excluded due to non-native plants. Is there any evidence that non-native plants have adversely affected ecosystem processes and functions? That which is currently riparian habitat in the Delta is largely the product of human constructs. Due to this, what is the context of "native" when the riparian morphometry and habitat are so altered from the natural state? Additionally, stands of eucalyptus trees are used by heron and egrets for rookeries and bamboo provides habitat for resident fishes.

Page 56 Predation and Competitions: A rating of one diamond for the target of reducing predation losses in Clifton Court Forebay is too low. It should be rated three diamonds. The target lacks quantification of the reduction being sought. We recommend that the target specify 75 to 90 percent. We also recommend an additional target and actions that address reducing in-channel predation around human structures.

Page 56, Right Column, Rationale: The last sentence does not adequately characterize how some water conveyance alternatives could eliminate the need to pursue actions related to predation control in Clifton Court Forebay. Additional language should be added.

Page 58, Delta Smelt: Add "state" after "is" in the second line.

Page 60, Splittail: Reference to the splittail as a state candidate should be deleted.

Page 60, Splittail, Paragraph 3: The need for flows to carry splittail larvae and juveniles downstream has yet to be demonstrated as needed or important.

Page 60, Left Column, Rationale: Restoring flood plain processes will also benefit splittail.

Page 58-62: Targets for aquatic species should be rated with three diamonds not one or two.

Page 63, Column 1, Last Paragraph: It is unknown if there is a link between outflow and shiner perch.

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Page 64, Western Spadefoot and California Tiger Salamander: Add perennial grassland to the target.

Page 65, Red-legged Frog: The rationale section should include reference to using proper water management techniques in the canals, side channels, backflow pools, and ponds to discourage establishment of predatory species such as bullfrogs and non-native fish.

Page 67, Greater Sandhill Crane, Programmatic Action: Add seasonal wetland to the habitats to be restored.

Page 71, References: Some references in this vision are not cited in this section previously and should be.

Page 76, Right Column, Paragraph One: Comments made on this same section in the Delta Zone apply here as well.

Page 77, Column 2, Paragraph 2: It is unclear what nontidal-perennial aquatic habitat is and how some of the attributes assigned to it are achieved. Clarify this type of habitat and its attributes. The discussion concerning lakes and ponds behind levees on reclaimed islands is inaccurate. DFG is unaware of such features within the North Bay. The discussion indicates that such features support rare and declining species, some of which are listed as threatened or endangered by the State or Federal government; if this is true, these species should be identified since we are unaware of listed species which would use such habitats. It appears this paragraph confuses ponds and lakes with seasonal periods which occur on these lands and may be an instance where a habitat feature which may be found in the Delta has been assumed to occur in the Suisun/North Bay Zone.

Page 77, Column 2, Paragraph 4: The second part of the discussion on tidal marshes is confusing. The discussion talks of the important habitat attributes of emergent marshes. The discussion should identify the type of emergent marsh. In this case, it is assumed to mean tidal emergent, but it is unclear. There also needs to be a discussion of the primary wetland - pickleweed marshes.

Page 77, Column 2, Paragraph 5: This paragraph, which continues on page 78, discusses seasonal wetlands. The discussion intimates that such wetlands were an abundant feature in the Suisun/North Bay Zone prior to reclamation. Since this zone historically was predominately tidal marsh, it is unclear where such habitats existed other than along tributary streams or in the surrounding uplands. The discussion seems to better describe situations which would occur along the upper river systems tributary to the Napa Bay. Seasonal wetlands in the Suisun/North Bay Zone are generally either managed wetlands or farmlands which seasonally

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pond water. These wetlands, while providing habitat for waterfowl, shorebirds, and other wildlife species, would not be considered fish habitats because of their inaccessibility and seasonal characteristics.

Page 78, Column 2, Paragraph 3: Levee construction is identified as resulting in the loss of riparian, wetland, and shallow water habitat in the North Bay. This is a confusing statement which seems more appropriate in a discussion of the Delta. In the Suisun/North Bay Zone levee construction has resulted in a reduction in tidal marsh and shallow-water habitats and expansion of managed and seasonal wetlands in the reclaimed area. Riparian habitats in this zone are found along the tributary streams at the upper reaches of the tides. Riparian habitat is not generally found in areas subject to reclamation by levee construction due to high salinity.

Page 78, Column 2, Paragraph 4: Dredging and disposal of dredged material has led to the loss and degradation of aquatic habitats and vegetated berm islands. This again seems to be a discussion more associated with the Delta. Dredging in the zone has resulted in direct loss of tidal wetlands, mudflats, and sloughs and the filling of seasonal wetlands behind dikes. It is unknown what is meant by berm islands since these do not appear to be a habitat feature of the zone.

Page 79, Column 1, Paragraph 5: Delta smelt are listed by both the state and federal governments as threatened.

Page 81, Left Column, Paragraph 5: The Suisun song sparrow is found only in the Suisun Bay. This subspecies does not occur in the North Bay. The North Bay is populated by the San Pablo song sparrow, a separate subspecies which is a species of special concern.

Page 81, Right Column, Paragraph 1: The name of the bridge in the fourth line should be provided.

Page 81, Right Column, Paragraph 2, Sentence 5: This statement should be checked for accuracy, as it is believed that the gates have the ability to operate from September through May. September operations have occurred in the past and discussions are underway regarding fishery impacts associated with this operation schedule.

Page 82, Descriptions of Ecological Units: The descriptions of Ecological Units needs to be improved for the Napa River, Sonoma Creek, Petaluma River, and San Pablo Bay Units. We recommend that they be rewritten as follows:

Napa River Ecological Unit:

Following, "... connecting to *San Pablo Bay* ..." the paragraph should read:
The majority of the southern area is Baylands which was historically tidal marsh. Currently,

most of the Baylands have been reclaimed for salt or agricultural production. A network of sloughs fringed by saline emergent marsh is also present. The sloughs have become silted as a result of lost tidal prism. The Baylands are surrounded by uplands composed primarily of grasslands which are rapidly being converted to urban and agricultural (vineyard) uses. In the north, natural upper river watershed habitats include grasslands, oak savanna, oak woodlands, mixed conifer, and chaparral. Vineyards are the predominant land use in the upper watershed. Extensive urban development along the river is associated with the cities of Napa and Vallejo. Stream and riparian habitats have been reduced by agricultural and urban development and flood control measures.

(Note: Vernal pools and other seasonal wetlands characteristically found in the upper watershed have been almost entirely eliminated in the Napa River Ecological Zone. This is also true for oak savanna. These habitats were on the valley floor which has been largely converted to vineyards.)

Sonoma Creek Ecological Unit:

Beginning with the second sentence, we suggest the following:

The main habitat types of the southern portion of the unit are the Baylands, composed of tidal sloughs with narrow fringing marshes, some diked managed wetlands, diked farm lands, mostly oat and hay, and surrounding uplands characterized by grasslands, vernal pools, and oak woodlands quickly being converted to vineyards. Tidal marshes and channels are reduced as a result of reclamation. Seasonal wetlands develop during the rainy season on reclaimed agricultural lands. Urban development along the upper river is associated with the city of Sonoma. Vineyards are the predominant land use in the upper watershed particularly on the valley floor. The mountains of the watershed are characterized by oak woodlands, chaparral, and mixed conifer habitats.

(Note: As in the Napa Unit much of the vernal pool, seasonal wetland and oak savanna habitat found on the valley floor and at the foot of the hills has been eliminated as a result of agricultural and urban development.)

Petaluma River Ecological Unit:

Beginning with the second sentence, we recommend the following revision:

The lower portion of the watershed is composed of tidal marshes and sloughs, and diked seasonal wetlands and historic baylands which have been reclaimed for agriculture. The diked agricultural lands intermittently pond water during the rainy season which provides habitat for shorebirds and waterfowl. The surrounding uplands are characterized by open grasslands and oak savannas. This unit contains the largest extant of natural tidal marsh on the west coast. The upper watershed is rapidly developing with Petaluma, the largest city. Agricultural uses include grazing, oat hay production, and vineyards.

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San Pablo Bay

It is questionable whether the salinity is stratified most of the year or not. This might be the case under high outflow conditions, but is not the condition in dry periods/years. The mixing zone would be upstream of San Pablo Bay in dry years.

Page 82, Vision for the Ecological Zone: Steelhead were historically present in the Napa River, Sonoma Creek, and Petaluma River Ecological Units, and are still found in most of these streams. Steelhead should be included in the Vision for these ecological units. The major factor limiting steelhead populations in these streams is agricultural development (water diversion, barriers due to diversion dams, high temperature and other water quality impacts from run-off).

Page 83, Left Column, Paragraph 5, Sentence 1: This paragraph should be changed to accurately reflect the Suisun Ecological Workgroup's (SEW) purpose. The State Water Resources Control Board (SWRCB) task to SEW is, in part, to identify specific measures to implement the Suisun Marsh narrative objective, evaluate the water quality objectives for the Marsh, and identify and analyze specific public interest values and water quality needs to preserve and protect the Suisun Marsh Ecosystem. Currently, SEW is not addressing what types of wetlands should be restored. CALFED may want to contact a SEW representative and reassess this paragraph.

Page 83, Left Column, Last paragraph: Change "North Delta" to "Yolo Basin."

Page 83, Right Column, Paragraph One: Change "IEP's Suisun Ecological Workshop" to "Suisun Ecological Workgroup".

Page 83, Suisun Bay and Marsh Ecological Unit, Sentence 1: Management practices maintain relatively fresh water in the Marsh for effective leaching of managed lands. CALFED should evaluate if a progressively fresher marsh is actually restoring the historical brackish nature of Suisun Marsh.

Page 84, Napa River Ecological Unit, Existing habitats: The tidal marshes of this area are of limited size and habitat quality due to past reclamation. Remaining tidal marshes are linear with little channel development. The larger sloughs have silted up due to a reduced tidal prism. This same comment applies to the Sonoma and Petaluma units.

It is questionable whether it will be possible to create large areas of riparian habitat in this zone, which is a stated goal. Due to salinities in tidal area, riparian habitats are restricted to tributary streams to the bay. Certainly, enhancement of riparian

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habitat along the Napa River and other streams and their tributaries, would be highly desirable for enhancement of habitat for steelhead, freshwater shrimp, and neotropical migrants.

Sonoma Creek Ecological Unit: "*Leveed, managed marshland...*" should be changed to, "*Leveed, historic marshlands...*" Restoration of existing managed marshlands may not be desirable as these lands support significant numbers of shorebirds and waterfowl. To achieve this objective, acquisition and restoration of other diked Baylands may be required.

Page 85, Saline Emergent Wetlands: Add "tidal" to this habitat vision.

Page 86, Riparian and Shaded Riverine Aquatic Habitat: This habitat type is found along stream tributaries to the bays and wetlands in the Suisun/North Bay Zone. This habitat would not be expected along sloughs, marshes, and bay shorelines in this zone. Such areas would be characterized by emergent marsh.

Page 86, Paragraph 4, Sentence 1 & 2: This paragraph does not describe a vision for the reducing the introduction of non-native species. Should the statement "*Further changes can be expected if ballast water releases into the Bay are not restricted.*" be interpreted as CALFED advocates ballast water release restrictions to reduce the influx of exotic species?

Page 88, Suisun Song Sparrow: This subspecies does not occur in the North Bay. It would be more appropriate to discuss the San Pablo song sparrow which is the North Bay version of the Suisun song sparrow.

Page 88, Paragraph 11, Sentence 1: The title mentions Lange's Metalmark Butterfly, however, the vision does not.

Page 89, Left Column, Paragraph 1, Sentence 1: The second line should say, "One of the major ecosystem processes...". Restored Delta channel hydraulics and aquatic foodweb processes are also major ecosystem processes that must be restored in order to achieve CALFED's objectives.

Page 89, Left Column, Paragraphs 2 and 3: These paragraphs appear out of place and perhaps are better suited to discussions on phasing and implementation specific to this zone. A separate heading may help address this concern.

Page 89, Left Column, Paragraph 2: Delete references to the South Delta and Contra Costa pumping plants. They are not in this zone.

Page 89, Integration with Other Restoration Programs: This section should include the Vernalis Adaptive Management Program (VAMP). VAMP's framework agreement defines flows down the San Joaquin River and a 12 year monitoring program. CALFED should include this program in this section. Additionally, this section should also include the San Francisco Bay Joint Venture, Native fish Recovery Plan, Delta Wildlife Habitat and Protection Plan, and the Winter-run Recovery Plan.

Page 90, Delta Wildlife Habitat Protection and Restoration Plan: This section should be moved to the Delta zone.

Page 93, Natural Floodplain and Flood Processes and Bay-Delta Aquatic Foodweb: Targets for both processes should be given three diamonds instead of one.

Target 1: This target is ambiguous since flood plain is not well defined. Does this apply only to nontidal lands where streams overtop their banks or does it include tidal situations? If it deals only with nontidal settings, it may be a realistic objective. If tidal lands are included, this objective should be increased substantially.

Page 93, Tidal Perennial Aquatic Habitat, Programmatic Action 1B: This action calls for the acquisition and restoration of 1,000 acres of shallow water habitat in the San Pablo Bay Ecological Unit. It is not believed possible to achieve this objective in the San Pablo Unit. This unit is characterized by open bay and intertidal flats. As depicted in Figure 7 and described in the text, no lands are available to acquire or restore for this purpose.

Development of shallow water habitats in the North Bay will require large-scale tidal restoration to expand and maintain third through fifth order slough channels. Larger sloughs provided the shallow water habitat which existed under historic conditions in the North Bay. Acquiring and restoring diked subsided lands will create shallow water habitats in the short-term. Sedimentation will occur over the long term and the area will develop into a saline emergent marsh. This objective will only be achievable in the Napa River, Sonoma Creek, and Petaluma River units.

Page 94, Nontidal Perennial Aquatic Habitat: The implementation objective indicates this is an important objective for the Delta. The text should be modified to make this an objective for the Suisun/North Bay if that is the intent.

Target 1. Develop 500 acres of deeper, open water habitat. This target indicates that it would provide habitat for associate resident fish species. It is unclear to us what resident fish species would benefit in the Suisun/North Bay Zone since the species of concern are all associated with tidal or stream habitats in this Zone.

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Programmatic Actions 1A and 1B, call for acquisition and development of such habitat in 100- and 200-acre patches in the Suisun, Sonoma, and Petaluma units. It is unclear why such habitat is not identified for the Napa unit. In addition, data collected for canvasbacks in the North Bay by the USGS indicates that such habitat may need to be a minimum of 200 hectares, approximately 400 acres, to provide a suitable habitat for that species. Such habitat in the North Bay is provided by the lower Napa River, some salt ponds, and tidal lagoons.

Tidal Sloughs, Implementation Objective: Freshwater should be removed from the first sentence. Within the Suisun/North Bay Zone tidally influenced emergent wetland, mudflats are predominately saline or brackish. Additionally, seasonal flood plain in the sense of a riverine system is not present.

Page 94, Nontidal Perennial Aquatic Habitat: The implementation objective indicates this is an important objective for the Delta. The text should be modified to make this an objective for the Suisun/North Bay if that is the intent.

Target 1. Develop 500 acres of deeper, open water habitat. This target indicates that it would provide habitat for associate resident fish species. It is unclear to us what resident fish species would benefit in the Suisun/North Bay Zone since the species of concern are all associated with tidal or stream habitats in this Zone. Additionally, this target should receive three diamonds.

Programmatic Actions 1A and 1B, call for acquisition and development of such habitat in 100- and 200-acre patches in the Suisun, Sonoma, and Petaluma units. It is unclear why such habitat is not identified for the Napa unit. In addition, data collected for canvasbacks in the North Bay by the USGS indicates that such habitat may need to be a minimum of 200 hectares, approximately 400 acres, to provide a suitable habitat for that species. Such habitat in the North Bay is provided by the lower Napa River, some salt ponds, and tidal lagoons.

Tidal Sloughs, Implementation objective: Freshwater should be removed from the first sentence. In the Suisun/North Bay Zone tidally influenced emergent wetland are primarily saline or brackish. Seasonal flood plain in the sense of a riverine system is not present.

Target 1: Restore slough habitat for fish and associated wildlife species. We do not believe that this can be met in the San Pablo unit given its current habitat composition discussed previously. This unit should be deleted from the target. This objective will require significant tidal restoration in the identified units to establish and maintain the target amounts of the habitat. This may require a substantial reduction in dike wetlands to achieve, particularly in the Suisun unit.

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Page 94, Tidal Slough: Add the following to the rationale: These sloughs can also provide loafing sites for waterfowl, particularly diving ducks in the North Bay.

Page 95, Paragraph 1, Target 1, Sentence 1: CALFED is going to restore and manage 3,000 acres of additional seasonal wetlands within Suisun Bay and San Pablo Bay. Some restoration lands within Suisun Bay should provide fish and wildlife habitat that support non-consumptive uses.

Target 1: Restore slough habitat for fish and associated wildlife species. We do not believe that this can be met in the San Pablo unit given its current habitat composition discussed previously. This unit should be deleted from the target. This objective will require significant tidal restoration in the identified units to establish and maintain the target amounts of the habitat. This may require a substantial reduction in diked wetlands to achieve, particularly in the Suisun unit.

Page 96, Left Column, Programmatic Action Plan 1A: Jepson Prairie is in the Yolo Basin Zone.

Page 97, Perennial Grasslands, Rationale: The rationale needs to be modified so it does not leave the impression that perennial grassland is escape cover for Suisun song sparrows.

Page 98, Column 1, Programmatic Action 1A: "...consolidate screen or eliminate diversion onto manage agricultural lands..." There are no known agricultural diversions in either the North Bay or Suisun Marsh. Agriculture water controls are for draining lands behind the levees.

Page 98, Programmatic Action 1C: Delete this action since it is not relevant to this zone.

Page 99, Target 2: This target and related actions are not relevant to this implementation objective. A separate implementation objective related to invasive aquatic organisms needs to be added back into this zone.

Page 100, Paragraph 2 & 3: Target 1 and Programmatic Action 1A seem contradictory at first glance. It might be appropriate to clarify that limited studies have shown two year old striped bass have less of an impact on anadromous and estuarine fish than one year old striped bass.

Page 104, Striped Bass: March to May as a period for increase in Delta inflow and outflow has not been the period identified by DFG as the period of most import for striped bass young production. DFG has identified April to July as the most relevant period when spawning and transport of fish to the nursery areas occurs. However, flows during other periods are also likely to be important.

Page 108, California Clapper Rail: The target for this species should be changed to focus on development of adequate habitat for the species and establishment of secure, large populations. This species requires large, well developed tidal marshes, marshes with a high density of tidal channels, to sustain populations that could achieve the desired objective. Such restoration should be done adjacent to upland habitats where possible. To achieve this objective, the target acreages of saline emergent wetlands identified for the Petaluma, Sonoma, and Napa units should be increased. This would also argue for the inclusion of the Marin shoreline within the Zone as noted previously. We anticipate that the San Francisco Bay Area Regional Wetlands Ecosystem Goals Project along with the Tidal Marsh Species Recovery Plan currently in preparation will provide guidance on measures to achieve the objectives for this species.

Suisun Song Sparrow

Programmatic Action 1A: DFG is concerned how this could feasibly be accomplished without setting back existing levees. This objective may be better satisfied by focusing on restoration of saline emergent wetlands restoration. More recent population estimates for this species are available and should be used in the species description. Marshall, J.T. and K.G. Dedrick, 1994. Endemic Song Sparrows and Yellowthroats of San Francisco Bay. Pg. 316-327 in N.K. Johnson & J. Jehl (Eds.), A Century of Avifaunal Change in Western North America. Studies in Avian Biology 15. Research in press by the Point Reyes Bird Observatory.

Add a target that reads: Restore sufficient tidal emergent wetland to expand the number of known nesting territories in the Suisun Marsh unit by 200 percent.

Page 109, Salt Marsh Harvest Mouse: Programmatic Action 1A: Reintroduction of the species is questionable since most known suitable habitats in the Zone are occupied. Certainly the target could not be achieved by the proposed action. It is recommended that the programmatic action be changed to focus on the restoration to high tidal marsh habitats in proximity to uplands. This could be achieved in conjunction with the objectives for saline emergent marsh.

The implications of restoring 5,000 to 7,000 acres of saline emergent wetlands in the Suisun Marsh unit is a concern since this will require the conversion of existing salt marsh harvest mouse habitat.

Shorebirds and Wading Birds

The benefit of emergent wetlands to shorebirds is questionable unless water management includes maintaining shallow, open conditions and allows for a draw down at appropriate times, particularly in the spring. Seasonal wetlands with appropriate management should be

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an objective for this species group. Additionally, enhancement of tidal perennial aquatic habitats can be expected to increase the amount of mudflat available for shorebirds.

Waterfowl

It should be identified that managed marshes, especially the privately-owned duck clubs, provide the majority of waterfowl habitat. Programmatic action should include a recognition of the privately-owned wetlands and seek to encourage their management to maximize benefit to waterfowl and other species that utilize these managed wetlands.

Page 116, Column 2, Paragraph 4: Increasing flows in early spring also assists in successful migration of salmon and steelhead juveniles.

Page 117, Column 2, Paragraph 1:

The ACID problem affecting downstream migration of salmon and steelhead has been remedied. Because the dam is seasonally impairs upstream migration.

Page 116, Paragraph 3: The last sentence refers to California hibiscus. California hibiscus is now Rose mallow.

Page 120, Vision for the Ecological Zone: It would be appropriate to include a paragraph relative to sturgeon, such as is included on page 240 for the Feather River. The mainstem Sacramento River above Verona may be the most important sturgeon spawning and rearing habitat in the Central Valley, particularly in view of the recent information regarding green sturgeon spawning in the river above Hamilton City.

Page 139, Paragraph 1: The statement is made "On occasion, fish deaths (including salmon) have been documented in the upper Sacramento River as a result of IMM waste." Various reports, including the recent litigation have referenced "fish deaths". Although deaths may not be documented, it certainly has been documented that toxicity levels have been exceeded.

Page 141, Rationale: The last two sentences discuss "Augmentation production of fall-run chinook salmon"...."despite its healthy state." It might be appropriate to suggest the need for some level of focused research to evaluate this. Recent returns to CNFH of fall-run chinook, seem to indicate that the hatchery is heavily supporting the entire fall-run population particularly in Battle Creek, all of which were probably from CNFH. The estimate for the rest of the Sacramento River above RBDD, excluding Battle Creek, was only 40,000 fish, which may also have been heavily impacted by CNFH production. It would thus be a misnomer to suggest a healthy "natural" fall-run population in the upper Sacramento River without some additional evaluations.

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Page 146, Rationale: Spring-run chinook salmon are currently classified as a "Candidate Species" under the California Endangered Species Act.

The statement is made "The status of spring-run chinook salmon in the mainstem Sacramento River is not known." There is general belief based upon ongoing investigations, that spring-run in the mainstem have been heavily introgressed with fall-run. It might be more appropriate to state "The status of spring-run chinook salmon in the mainstem Sacramento River is uncertain, however evidence suggests that there may be significant introgression with fall-run chinook salmon".

Page 153, Column 1, Paragraph 3, Sentence 2: Spring Creek should be called Clear Creek when referring to the creek below Whiskeytown Dam.

Page 153, Column 2, Last Paragraph, Last Sentence: This sentence is not accurate, therefore, it should be replaced with the following: Over the last five years gravel operators have halted the practice of instream mining. During this same period gravels were distributed to the spawning area from tributary stream sources, stream meander, and artificially introduced gravel stockpiles. At this time there are two completed gravel injection projects and one in progress.

Page 154, Column 1, Paragraph 3, Sentence 1: The abundance of fall-run chinook spawners (the apparent subject of this sentence) in Clear Creek has increased during the last two years when the fall flows have been increased by a factor of three. During this interim flow increase, the spawning population estimates have been between 7,000 and 9,000 representing 5% to 8% of the upper Sacramento River salmon population.

Page 154, Column 2, Paragraph 2, Sentence 1: The Department does not manage Clear Creek for spring-run chinook salmon at this time. All the spring-run habitat is upstream of the McCormick Saeltzer Dam which is a barrier that caused them to be extirpated from the creek. Spring-run cannot be reestablished until it is known that the returning adults will not be blocked from the cold water habitat above the dam.

Page 155, Column 2, Paragraph 1, Sentence 1: The description of Cow Creek flows is not fully represented by only describing the driest years for summer flow when it is "nearly dry". The USGS data surface water records show the mean August flow of 35 cfs, September at 45 cfs, and October at 131 cfs with a maximum August flow of 115 cfs and a minimum of 1 cfs. A more representative description to consider is the following: "Stream flows through the summer average 40 cfs and less than 1 cfs during extreme drought years."

Page 155, Column 1, Last Paragraph, Last Sentence: The sentence incorrectly infers that instream gravel mining is still occurring in Cow Creek. Instream gravel mining was eliminated with

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the passage of the Shasta County gravel mining ordinance. There has not been any instream gravel mining operation in Cow Creek for at least 12 years and possibly longer.

Page 156, Column 1, Last Paragraph, Sentence 1: The judgement regarding the water demands and streamflow needs is premature should be removed. Although the runoff in this stream is small, so too is the surrounding agricultural land as there is little valley land in the watershed.

Page 157, Column 1, Paragraph 4, Last Sentence: The statement that PG&E diverts up to 98% of the flow is somewhat misleading because the diversions are too small to divert this much during the wet season and times of higher releases in the 15 mile section. It is suggested that the following statement be substituted: "PG&E operates a series of small run-of-the-river hydroelectric diversions that divert up to 98% of the stream's baseflow and a much smaller portion of the wet season flow. Under an interim agreement the required minimum fishery releases to the creek are increased by a factor of 10 at three diversions in a 17 mile section of the creek system.

Page 157, Column 1, Last Paragraph, Sentence 1: The reservoirs mentioned here should be described as small reservoirs.

Page 158, Paragraph 6: Winter-run chinook are a federally listed "Endangered Species", not a "Threatened Species" as stated.

Page 158, Column 1, Paragraph 3, Sentence 1: The mentioning of conflict in this sentence leaves open the resolution question making the situation sound negative. It is recommended that the following sentence be substituted: Restoring the remnant populations of naturally spawning salmon and steelhead located above the fish hatchery barrier dam to a healthy status can be done in a manner that integrates the beneficial uses of hydropower production and aquaculture in the watershed.

Page 158, Column 1, Paragraph 4, First Sentence: Anadromous fish have historically traveled above the hatchery during minor and major storm events each year which flood out the fish hatchery barrier dam and when the fish ladder at the barrier dam has been opened for four to five months during past years.

Page 158, Column 2, Paragraph 1, Sentence 2: This project is beyond funding. The present level of ozonation at Coleman Hatchery (10,000 gpm) is sufficient to sterilize all the water needed to produce the early life stages of salmon and steelhead and one-third of the water necessary to produce juvenile fish. The environmental documents and preliminary funding arrangements have been completed to begin the construction of the remaining two-thirds of the water supply needed for juvenile fish production.

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Page 158, Column 2, Paragraph 2, Sentence 2: The mention of anadromous fish in this sentence should be qualified. Historically steelhead, winter-run chinook and spring-run chinook passage was not restricted in the watershed for purposes of managing disease risk at the hatchery. The fall-run and late fall-run chinook have been restricted to manage against disease risk. Therefore the following qualification is recommended, "... those races of *salmon that represent a significant disease risk* are restricted through *seasonal* fish ladder closures..."

Page 158, Column 2, Paragraph 3, Last Sentence: The winter-run chinook artificial propagation program at Coleman was stopped and is in the process of being moved to a new facility at the base of Shasta Dam. This is scheduled to be operational by January 1998.

Page 158, Column 2, Paragraph 4, Sentence 2: Winter-run restoration should simply be the reestablishment of winter-run chinook salmon which will not require further engineering. All the actions for spring-run chinook and steelhead will accommodate winter-run chinook.

Page 158, Last Paragraph, Sentence 1: The stream reaches up to Maccumber dam are not reachable by anadromous fish because of barriers. The anadromous reach in the North Fork Battle Creek extends up to approximately two miles above the North Fork Battle Feeder Dam. The following description of spawning area is recommended: The recent (1991) evaluation of spawning habitat in the portions of Battle Creek watershed accessible to anadromous fish above Coleman Hatchery Fish Barrier estimate 166,000 square feet of spawning gravel. Potentially this much spawning habitat could accommodate 3,500 spawning pairs.

Page 159, Column 1, First Paragraph, Sentence 1: The stream reaches up to MacCumber dam are not reachable by anadromous fish because of barriers. Too, this paragraph might be an appropriate place to mention other ecosystem benefits of reestablishing healthy salmon populations in the watershed. Specifically, there is an active bald eagle nest below the Coleman Fish Barrier Dam and at MacCumber Lake. It is reasonable to project that the reestablishment of salmon population in the intervening stream reaches that presently do not have eagles (e.g. Eagle Canyon) may allow new nesting territories to develop. The relationship between bald eagles and fishery restoration has been documented in the Pit River and in the Flathead System in Montana where as the Calkin salmon abundance is allowed to expand the range of the bald eagle has expanded.

Page 160, Paragraph 3: Discussion of the vision for the Bear Creek Ecological Unit should include the potential value for juvenile salmonid "non-natal" rearing. Recent studies through Chico State University have documented some level of non-natal rearing in Bear Creek.

Page 172, Spring-run Chinook Salmon, Rationale: Spring-run chinook are a California "Candidate Species" under CESA.

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Page 186, Programmatic Action 1A, Rationale: Once again spring-run chinook are a "Candidate Species" under CESA.

Page 191, Paragraph 5: In the discussion of restoring fall-run chinook to Stony Creek, giant reed control is mentioned. Tamarix (salt cedar) should also be added to the list.

Page 193, Paragraph 5: Water temperature impacts from the Colusa Basin at Knights Landing are probably not a significant problem during May and June as stated. In general, rice floodup and maintenance precludes significant drainwater during this period. There may be significant thermal impacts during rice field dewatering prior to harvest in late August and September, however.

Page 209, Paragraph 2: Discussion of Antelope Creek salmon populations (fall and spring-run) seem to be lacking significant substantiation. It might be appropriate to qualify the stated numbers as being open to question.

Page 210, Paragraph 1: The range of Mill Creek spring-run chinook from "...a maximum of 3,500 fish was an estimate based upon the visual observation of 12 carcasses and 330 live salmon. It might be valuable in general to preface historical population numbers as estimates.

Page 211, Paragraph 1: It would be appropriate in this section to acknowledge that the Mill Creek Conservancy recently completed a Watershed Management Strategy Report. Additionally, the second sentence could be changed to read :Restoring and maintaining Mill Creek should involve building upon the recently completed Watershed Management Strategy Report with the potential ultimate objective a comprehensive watershed management plan".

_____, **Paragraph 5:** Discussion of the potential sustainable populations of salmon and steelhead in the various tributaries should be qualified as estimates based upon estimates of historical numbers.

Page 215, Paragraph 1: Eliminate the sentence which reads in part "...DFG annual estimates of spring-run chinook and Pacific Gas and Electric ...". The sentence is inaccurate and seems to contradict the rest of the paragraph.

_____, **Paragraph 3:** The statement is made that "passage at seven of the dams could be improved by upgrading ladders". Currently, three of the seven dams are being removed as part of the Western Canal siphon project, and three others (Durham Mutual, Adams, and Gorrill) have defined projects to build or rebuild ladders and fish screens.

Page 216, Paragraph 2: Discussion of extending State Watermaster Service should include discussion

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of an adjudication of water rights in the non-adjudicial reach of Butte Creek below the Western Canal. State Watermaster Service can only be implemented on an adjudicated stream.

_____, **Paragraph 3:** The last sentence discusses "... purchasing existing water rights from willing sellers". I would suggest substituting "acquiring" for "purchasing" since several recent water rights have involved trades instead of outright purchases.

_____, **Paragraph 4:** It is generally believed that gravel recruitment in the upper reaches of Butte Creek is not affected by existing diversion dams since they are either seasonal agricultural dams or relative low head hydropower dams which have not had major impacts on gravel recruitment.

_____, **Paragraph 5:** Change the first sentence to read "The Butte Creek Watershed Conservancy is an important..."

In the last part of the paragraph referring to timber harvest in the upper watershed, the discussion should be revised to reflect the current situation. I would suggest rewording as follows:
"Current timber harvest in the upper watershed is generally not a threat to salmon holding and spawning areas. Maintaining the existing harvest and well-planned road construction will minimize any future effects."

_____, **Paragraph 7:** The first sentence which discusses passage at diversion dams should read "...including Durham Mutual, Adams, Gorrill, Western Canal, McGowan and McPherrin."

Eliminate the sentence which reads "A more direct route to the Sacramento River further upstream is needed." The sentence is misleading as it seems to imply something other than improving access at the butte Slough Outfall Gates.

Page 218, Paragraph 1: The last sentence discusses a comprehensive watershed management plan. Recognizing the efforts of the Conservancy and the recently completed Watershed Management Strategy Report, change the sentence to read "This could be accomplished by building upon the recently completed Watershed Management Strategy Report developed by the Mill Creek Watershed Conservancy."

_____, **Paragraph 2:** Part of the vision of deer Creek mentions "screening diversions". Currently all diversions on Deer Creek are screened. The last sentence discussed development of a watershed management and restoration program. It would be appropriate to recognize the existing Deer Creek Conservancy effort which is developing a Watershed Strategy Report.

_____, **Paragraph 4:** As previously stated in general, population goals for salmon and steel head should be clearly identified as estimates and not absolutes based upon some quantifiable

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criteria. The population numbers for Butte Creek are "best estimates".

Page 222, Target 6: Change the sentence to read "Maintain a minimum year-round flow of 40 cfs in Butte Creek in the reach between the Centerville Diversion Dam and the Centerville Powerhouse". This is a minimum flow for the reach, and one might have concluded that 40 cfs was appropriate for the entire length of Butte Creek, which is not true.

Page 223, Programmatic Action 3A, 4A: Both actions discuss "reactivating" sediment transport processes. I would suggest eliminating the word "reactivating" and leave "maintaining".

Page 225, Target 3, 4: Targets are identified as "15 miles" along both Butte and Big Chico creeks. Since there is no basis for the "15 miles", it would seem appropriate to eliminate that estimate. In the case of Butte Creek, the need could potentially be far greater than 15 miles, and if stated as 15 miles, might be interpreted by some as an absolute.

Page 230, Paragraph 2, Rationale: Spring-run chinook are a "Candidate Species" under CESA.

_____, **Paragraph 3, Rationale:** Discussion of "Declines in spring-run chinook abundance" should include specific reference to Delta Diversions.

Page 232, Paragraph 2: The last part of the paragraph discusses the value of the Sutter Bypass, particularly to Butte Creek spring- and fall-run. It would be appropriate to provide some amplification that in most years, almost all populations of upper Sacramento River migratory fish are potentially impacted by the Sutter Bypass. The bypass system (Tisdale, Colusa, and Moulton) are configured such that at river flows exceeding approximately 22,000 cfs, flows begin to be diverted into the Sutter Bypass. At river flows above approximately 30,000 cfs, all flows are diverted into the bypass.

_____, **Paragraph 5:** discussion of important species should include winter-run and late-fall run chinook in addition to the mentioned spring- and fall-run.

Page 234, Paragraph 4, 5: Discussion of Feather River Hatchery spring-run chinook should include some discussion of the demonstrated introgression of the fall and spring run. There is ample evidence of such from the CWT returns. Randy Brown and Sheila Greene, (DWR, Environmental Services, Sacramento), in "An Evaluation of the Feather River Hatchery as Mitigation for Construction of the California State Water Project's Oroville Dam", concluded that there was introgression. They stated "About 20% of the tagged juvenile chinook salmon from females identified as spring run when they returned as adults. Similarly, about 29% of tagged juveniles from adults identified as fall-run adults returning to FRH". A more recent analysis shows that in some years misidentifications have been as high as 74%.

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Page 235, Yuba River Ecological Unit: It should be acknowledged in this section that the Yuba River is the only remaining wild steelhead fishery in the Central Valley (that is, it is the only area that anglers target for wild steelhead fishing). All other streams that have wild populations are either so low that they do not support a fishery or they are closed to angling.

Page 235, Paragraph 3: What is reference for the statement that in the Feather River, "Resident striped bass are found in the river year round"?

Page 239, Paragraph 6: It is probably incorrect to state that "Butte Slough, which winds through the Sutter Bypass between the mouth of Butte Creek at the north end of the Bypass and the Feather River at the south end". Currently, Butte Slough is identified as the reach extending from the Butte Slough Outfall Gates, to the north end of the Sutter Bypass. The reach withing the Sutter Bypass is generally referred to as the East and West Barrows, or channels, and the connection with the Sacramento River near Verona, is Sacramento Slough. It might be appropriate to restate that flows begin to enter the Sutter Bypass when Sacramento river flows exceed approximately 22,000 cfs, and all flows go through the Bypass when the Sacramento River exceeds approximately 30,000 cfs at the Tisdale Weir.

Page 240, Paragraph 1: It might be appropriate to add to the last sentence, which talks about stranding in receding flood waters, the following "and respective overflow weirs (Moulton, Colusa, and Tisdale) .

Page 253; Dams, Reservoirs, Weirs, and Other Human-made Structures: It is recommended that the following be added as a Programmatic Action:

A study should be done to determine the feasibility of removing Englebright Dam to allow steelhead and salmon to access historical spawning and rearing habitats.

Page 308, Habitat: In order to be consistent with the visions for the Delta and Suisun Marsh, perennial grassland and vernal pool habitats need to be discussed. Particularly as they relate to expanding the Jepson Prairie Preserve.

Page 310, Species: The delta green ground beetle needs to be discussed in this vision for the same reasons as discussed above.

Page 357, Central Valley Stream Temperatures: The concept of managing temperature along the mainstem San Joaquin should take the form of reduced exposure times, and be second in priority to protecting both spawning and nursery habitats in the eastside tributaries. Trying to manage tributary reservoirs to meet temperature objectives on the mainstem should only be done once nursery/spawning habitats have been optimized.

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Page 360, San Joaquin River Ecological Zone: Steelhead need to be included in the Vision for the Ecological Zone and the Species Vision. The lower San Joaquin River is an important migratory corridor for steelhead populations of the Stanislaus River and possibly other tributaries (see below).

Page 367, Column 1, Paragraph 4, Steelhead: We do not agree with the statement that, "The presence of a distinct anadromous run of steelhead on the lower Stanislaus River has not been confirmed." The Department has gone on record stating that a self-sustaining steelhead population is extant in the Stanislaus River (Department of Fish and Game 1997. Letter from Jacqueline Schafer to Garth Griffen dated 1/6/97 [DFG Comments on the Proposed Rule to list west coast steelhead under the Endangered Species Act]. DFG 1997). Further, the above statement is contradicted by the succeeding statements that, "... every year a small number of juvenile rainbow trout are caught in rotary screw traps at the mouth of the river. These fish show signs of smolting and appear to be migrating out of the system." What further evidence is needed that a naturally-spawning steelhead population exists other than the presence over consecutive years of juvenile rainbow trout that have obvious smolt characteristics and are actively emigrating? This is a better indicator of a self-sustaining population than the presence of adult spawning steelhead as the adults could be strays or their spawning could be unsuccessful.

The statements that, "A small number of steelhead smolts are also caught each year in the trawl surveys at Mossdale ... it is unknown if they these fish are ...resident rainbow trout or strays from another basin." does not make sense. Rainbow trout that exhibit smolt characteristics and are actively migrating are steelhead and cannot be *residents* by definition; and juvenile steelhead do not *stray* between basins.

Most of the fish captured at the rotary screw traps did not just *show signs of smolting* but were obvious smolts. These traps were operated by personnel from S.P. Cramer and Associates and they assign a *smolt index* value from 1 to 3 for all salmon and steelhead captured with 1 being an obvious parr and 3 being an obvious smolt. Most of the juvenile steelhead captured were assigned a value of 3.

Other evidence that a steelhead population is extant in the Stanislaus River includes:

- Department fishery biologists have documented successful reproduction (juvenile out-migrants) since 1988.
- Anglers in the Oakdale area report occasional steelhead from two to 10 pounds and creel census information obtained by the Department documents the catch

of rainbow trout greater than 20 inches (DFG data).

- Examination of limited scale samples from these larger trout by Department biologists show an accelerated growth period typical of estuary or ocean residence.
- An illegally harvested 28-inch steelhead was confiscated by Fish and Game Wardens in 1995.

The presence of smolting juveniles and the above statements provide ample evidence that a self-sustaining steelhead population exists in the Stanislaus River. Further, adequate habitat conditions, primarily flows and water temperatures, exist year-round below Goodwin Dam to support a steelhead population, hence the Stanislaus River represents the greatest potential for steelhead recovery in the San Joaquin River system. Restoration of flows in the Tuolumne River due to the Settlement Agreement may also provide adequate flows and temperatures for steelhead, and restoring steelhead populations to this system should not be overlooked. In light of all this, the Vision for the East San Joaquin Basin Ecological Zone needs to be revised to include recovery and restoration of steelhead populations.

Page 401, Column 2, Paragraph 2, Sentence 6: Sentence five states that improvements can be expanded by providing adequate high quality water to seasonal wetlands; sentence six states that water supplies could be increased by eliminating diversions to wetlands. These sentences are contradictory. Does changing the last word in sentence six from wetlands to *agricultural fields* convey what was meant?

Page 402, Column 1, Paragraph 3, Central Valley Streamflow: Change this sentence to read: Where possible, natural stream flows will be *protected, enhanced, and restored* to support riparian habitat and important species.

Page 403, Column 1, Paragraph 3, Sentence 2, Contaminants: Add "*and wildlife*" after fish.

Page 403, Column 1, Paragraph 4, Neotropical Migrant Birds: Replace the sentence with: *Protection, restoration, and enhancement of large, contiguous areas of riparian and wetland habitats that contain a great diversity in composition, density, and make-up will benefit the recovery of listed neotropical migrants such as the yellow-billed cuckoo as well as aid in the prevention of future listings of additional birds.*

Page 403, Column 1, Paragraph 4, California Red-Legged Frog: Replace the sentence with: *Protection, restoration, and enhancement of the zone streams and associated riparian and upland habitats will benefit the recovery of the red-legged frog. Efforts to manage invasive*

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species such as the bullfrog will also be carried out, where necessary, to benefit the recovery as well.

Page 403, Column 1, Paragraph 5, Waterfowl: Replace the sentence with: *Protection, restoration, and enhancement of wetland complexes and beneficial agricultural habitats with adjacent upland habitats will improve waterfowl use.*

Page 403, Column 2, Paragraph 2, Sentence 3: Change it to read: Agricultural management plans that are more friendly to wildlife *should be developed*, because studies have shown...extended periods *of time*.

Page 403, Column 2, Paragraph 2, Sentence 4: Change it to read: Such *practices, programs and efforts* can restore large blocks of land for relatively long periods *of time* while enhancing crop production and...

Page 403, Column 2, Paragraph 2, Sentence 5: Change it to read: Incentives should be developed to encourage landowners to *maintain at least ten percent of their land as fallow or non-agriculture.*

Page 405, Column 2, Paragraph 5, Programmatic Action 1C: Change it to read: Reduce or eliminate gravel mining *and stream bed altering* from active stream channels.

Page 405, Column 2, Paragraph 7, Sentence 1, Implementation Objective: Replace the word Delta (in the middle and end of the sentence) with West San Joaquin Basin.

Page 406, Column 1, Paragraph 1, Programmatic Action 1A: Change it to read: *Manage existing wetlands so that they maintain 40 percent open water to 60 percent vegetation.*

Page 406, Column 1, Paragraph 3, Implementation Objective: Change it to read, The implementation objective for fresh water emergent wetland habitat is to increase its amount by *protecting existing and restoring additional fresh emergent wetlands in the West San Joaquin Basin* to provide high-quality...

Page 406, Column 1, Paragraph 4, Target 1: Add a number of acres so that readers know what the effort is going to be.

Page 406, Column 2, Paragraph 8, Target 1: Add a number of acres so that readers know what the effort is going to be.

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Page 406, Column 2, Paragraph 3, Implementation Objective: Replace the word Delta with West San Joaquin Basin in three places within the sentence.

Page 406, Column 2, Paragraph 4, Target 1: Add a number of acres so that readers know what the effort is going to be.

Page 406 and 407, Implementation Objective: Change it to read: The implementation objective for riparian and riverine habitats is to restore riparian scrub, woodland, and forest along largely nonvegetated, *disturbed, or riprapped banks of the tributaries of the San Joaquin River* to create corridors of riparian vegetation to provide shaded riverine aquatic cover *and high-quality habitat for potential recovery of threatened species such as the yellow-billed cuckoo and other special status plant and animal species as well as other wildlife.*

Page 407, Column 1, Paragraph 3, Programmatic Action 1A: Delete the word *land* after purchased.

Page 407, Column 1, Paragraph 6, Target 1: Add *of native plants* after corridors.

Page 408, Column 1, Paragraph 1, Sentence 2: Add *and all of its tributaries* after Bay-Delta at the end of the sentence.

Page 408, Column 2, Paragraph 2: Add *and all of its tributaries* after Bay-Delta at the end of the sentence.

Page 409: There is no References section as found in all of the other visions throughout Volume II.

Figure 19: If the Lower and Upper divisions are not used in the vision for this zone, they should be deleted from the figure.

This concludes our comments. Thank you again for allowing us to review and comment on Volume II. Since our review of Volume I, two comments arose that may help in redrafting that volume as well as improve the clarity of this volume. Those additional comments are as follows:

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**Additional Comments
on Volume I**

Based on a review of proposals for Category III funding, there appears to be substantial confusion about the definition of tidal perennial aquatic habitat and tidal saline and fresh emergent wetlands. CALFED should provide a clearer definition of these habitats by defining them and referencing currently accepted classification schemes such as Sawyer and Keeler-Wolf (1995) or Cowardin et. al. (1979). For instance, tidal saline emergent wetlands are classified as the pickleweed series and tidal fresh emergent wetlands, in freshwater areas, are classified as bulrush series cattail series, and bulrush-cattail series by Sawyer and Keeler-Wolf (1995) and as estuarine inter-tidal persistent emergent wetland by Cowardin. Tidal perennial aquatic habitat would be characterized by the pondweed series in Sawyer and Keeler-Wolf (1995) and other appropriate Cowardin classifications to three meters MHT.

On page 75 of Volume I, statements were made that 87,500 acres of tidal perennial aquatic habitat were lost. This mischaracterizes the loss of tidal emergent wetland since the early 1900s described on page 14 of Volume II. This error should be corrected in the next draft of the ERPP.

This concludes our comments. Thank you again for allowing us to review and comment on Volume II. Should you or your staff have any questions about our input or we can be of any assistance in making the needed changes to address them please contact Mr. Frank Wernette at CALNET 8-423-7800.

Pete Chadwick
DFG/CALFED Liaison

cc: Regional Managers: 1, 2, 3, and 4
Division Chiefs: BDD, ESD, IFD, MRD, NHD, WMD, WPD
Mr. Frank Wernette, BDD

bc: Ms. Laurie Briden, BDD
Mr. Brad Burkholder, BDD
Ms. Heather McIntire, BDD
Mr. Lee Miller, BDD
Mr. Jim Orsi, BDD

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Mr. Bob Fujimura, BDD
Mr. Kevan Urqhart, BDD
Mr. Dennis McEwan, IFD
Mr. Jim White, ESD
Mr. Ed Littrell, Region 2

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